UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,390	05/05/2006	Im Young Jung	CU-4805 WWP	1845

26530   7590   12/05/2007
LADAS & PARRY LLP
224 SOUTH MICHIGAN AVENUE
SUITE 1600
CHICAGO, IL 60604

EXAMINER
GIARDINO JR, MARK A

ART UNIT	PAPER NUMBER
4113	

MAIL DATE	DELIVERY MODE
12/05/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/578,390	JUNG ET AL.
	Examiner	Art Unit	
	Mark A. Giardino	4113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 April 2007*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☒ Claim(s) *2, 3, 5, 6, & 9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 May 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☒ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date *7/31/2006*.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 142, 250, 310, 312, 314, 330, 350, 356, 360, 362, 364, 366, 368, 370, and 372. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: improper grammar on Page 1: "what influences a processing time is…how long time is required for examining".

Appropriate correction is required.

Claim Objections

Claim 2 is objected to because of the following informalities: awkward phrase "wherein the calculating the residual time." The examiner suggests using "wherein the calculating of the residual time." Appropriate correction is required.

Claims 3 and 5 are objected to because of the following informalities: awkward phrase "wherein the making the list." The examiner suggests using "wherein the making of the list." Appropriate correction is required.

Claims 6 and 9 are objected to because of the following informalities: awkward phrase "wherein the making the list." The examiner suggests using "wherein the making of the list." Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8-9 and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The words "concurrently" and "simultaneously" are unclear, since it is not explained in the specification how the memory is able to write and delete parts of the memory at exactly the same time. "Concurrently" and "simultaneously" have been construed to mean "during one host command cycle".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated

by Hasbun (US 5,640,529).

Regarding Claim 1, Hasbun teaches a garbage collection method comprising:

making a list of objects that must be deleted from memory (Column 9 Lines 54-

56, where selecting the block puts all dirty sectors on the block on the list of objects to

be deleted);

calculating a residual time up to a predetermined time limit after processing an

external command (Column 10 Line 66 to Column 11 Line 9, also see Figure 8);

deleting the listed objects from the memory during the residual time (Column 11

Lines 6-9, note that cleaning up the FLASH memory deletes the listed objects, see

Column 10 Lines 36-39);

storing a list of remaining objects that have not been deleted from the memory

during the residual time (Column 8 Lines 3-5, note that a block marked dirty is stored as

a remaining object that has not been deleted from memory).

Regarding Claim 2, Hasbun teaches all limitations of Claim 1, wherein the

calculating the residual time comprises: calculating a residual time remaining up to a

timeout limit determined by a host that transmits the external command (Column 10

Line 66 to Column 11 Line 2).

Regarding Claim 3, Hasbun teaches all limitations of Claim 1, wherein the

making of the list of objects comprises: making the list when garbage collection is

requested or when a communication session for receiving the external command is

initialized (see Figure 8, where a communication session for receiving the external

command is initialized in step 406, and the Cleanup State Machine begins on step 416,

which begins by making a list of objects that must be deleted from memory as described

in Column 9 Lines 54-56).

Claim 10 is the apparatus analogous to the method of Claim 1, and is rejected on

the same grounds.

Claim 13 is the computer readable medium recorded thereon a computer

readable program analogous to the method of Claim 1, and is rejected on the same

grounds.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Hasbun in View of Serlet (US 5,355,483).

Regarding Claim 4, Hasbun teaches all limitations of Claim 1 as discussed

above. However, Hasbun does not teach adding an object to the list of obects if that

object has not been deleted before during the making of the list. Serlet teaches a way

of listing object references in a memory such that all new objects in memory (thus

including ones that have not been deleted before) are added to a list of ones to be

marked for garbage collection (see Figure 7 in Serlet and "adding" step 706 in

particular). It would have been obvious to a person of ordinary skill in the art at the time

the invention was made to which the subject matter pertains to have used this method

of making a list instead of the way described by Hasbun, since this method does not

require the memory to be arranged in blocks, as required by the list making process of

Hasbun. Thus, one of ordinary skill in the art would realize the benefit of allowing

Hasbun's invention to be used on more types of memory than those organized in

blocks. Further, this method allows better garbage collection, since it checks for

memory references, instead of just marking blocks that are overwritten to and need to

be cleaned up. Because of this, one of ordinary skill in the art would also find it obvious

to use this list as the stored objects that have not been deleted in the method described

in Claim 1, since again, this list does not require that the memory is in blocks that

cannot be overwritten.

Regarding Claim 5, the combined device teaches all limitations of Claim 1,

wherein the making of the list of objects comprises: if an object is newly generated or

deleted during the command processing, updating the list of objects to be deleted (note

that when cleanup begins, the state machine described in Figure 7 of Serlet will make

the list as described in the discussion of Claim 4 above, and since the command is run

before cleanup begins as described in Column 11 Lines 5-6 in Hasbun, the list of

objects to be deleted is updated when the command newly generates or deletes an

object).

Regarding Claim 6, the combined device teaches all limitations of Claim 1,

wherein the deleting of the listed objects comprises: if there is residual time after the

listed objects are deleted, making a new list of objects to be deleted from the memory

(note that several clean-up states are performed, see Column 11 Lines 44-47 in

Hasbun, so if there is residual time after the listed objects are deleted, a new list of

objects is made in the next cleanup cycle).

Claims 7-9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Hasbun in view of Wells et al (US 5,740,395).

Regarding Claim 7, Hasbun teaches all limitations of Claim 1 as discussed

above. However, Hasbun does not teach deleting objects from the memory before the

external memory is processed if there is an existing list of objects to be deleted before

the list of objects to be deleted is made. Wells teaches attempting to write to the flash

device, but freeing memory before the write if the write cannot be done (Column 19

Lines 43-50 in Wells). It would have been obvious to a person of ordinary skill in the art

at the time the invention was made to which the subject matter pertains to have altered

the order of the commands to cleanup first, thus deleting the objects in the list from the

memory before the external command is processed. Wells provides the motivation

when he states that this allows the device to maintain minimum memory reserves

(Column 19 Lines 43-46 in Wells). Thus, by combining the devices, the additional

benefit of maintaining memory reserves necessary for proper performance is obtained.

Note that this combined device meets all limitations of Claim 8 as well, since

Hasbun teaches all limitations of Claim 1 as discussed above, and if the command

includes a memory write command or an object delete command (the command is a

memory write, see Column 19 Lines 21-23 and Figures 12A and 12B in Wells), and if

there is a list of objects to be deleted from the memory before the write or delete

command is processed, concurrently performing the deleting of the objects and the

write or delete command (Column 19 Lines 43-51 in Wells).

Regarding Claim 9, Hasbun teaches all limitations of Claim 1 as discussed

above. However, Hasbun does not teach simultaneously deleting consecutively existing

objects in memory, nor does he teach concurrently performing the allocating and

deleting of a memory block if memory space to be allocated for an object and memory

space of objects to be deleted are consecutive memory spaces or the same memory

space. Wells teaches simultaneously deleting consecutively existing objects in memory

(note how blocks are cleaned up in their entirety, thus the sectors consecutively existing

in memory are cleaned up simultaneously, see Column 21 Lines 50-55 in Wells). Wells

also teaches allocating and deleting a memory block concurrently (Column 21 Lines 50-

67 in Wells, note how the block is freed and a new block is selected, and that this new

block is likely to be the block that was just freed since the criteria for choosing a block

from the 5 Rules for choosing a block described by Wells have not changed

substantially). It would have been obvious to a person of ordinary skill in the art at the

time the invention was made to which the subject matter pertains to have used these

teachings of simultaneously deleting consecutive objects in consecutive memory space

and simultaneously deleting a memory space and allocating the memory space

because doing so is much faster than not performing the actions concurrently. Thus, by

combining the devices, one of ordinary skill in the art would realize that the benefit of a

faster device is obtained.

Claim 11 is the apparatus analogous to the method of Claim 7, and is rejected on

the same grounds.

Claim 12 is the apparatus according to the method of Claim 8, and is rejected on

the same grounds.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Mark A. Giardino whose telephone number is (571) 270-

3565. The examiner can normally be reached on M-R 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David Robertson can be reached on (571) 272-4186. The fax phone

number for the organization where this application or proceeding is assigned is 571-

273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M.A. Giardino   /David L. Robertson/
                                                     Supervisory Patent Examiner
/M. A. G./   Art Unit 4113

10/29/2007